

CHAPTER 7

FLOODS

Flooding can and has caused significant damage in Wyoming and are one of the more significant natural hazards in the state. It can cause millions of dollars in damage in just a few hours or days. Every county and many communities in the state have experienced some kind of flooding after spring rains, heavy thunderstorms, winter snow thaws, or ice jams.

A flood, as defined by the National Flood Insurance Program (NFIP), is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from: overflow of waters; unusual and rapid accumulation or runoff of surface waters from any source; or, a mudflow. Floods can be slow or fast rising, but generally develop over a period of many hours or days.

Floods can also occur with little or no warning and can reach full peak in only a few minutes. Such floods are called flash floods. A flash flood usually results from intense storms dropping large amounts of rain within a brief period. Floods can occur for reasons other than precipitation or rapidly melting snow. They can also occur because of ice jams or natural and man-made dam failures, both of which have occurred in Wyoming.

According to the National Flood Insurance Program Community Status Book, neither Crook County nor Pine Haven has been mapped for flood hazards. Thus, they are not required to participate in the NFIP. The incorporated communities of Hulett, Moorcroft, and Sundance within the County have been mapped and have Digital Flood Insurance Rate Maps (DFIRM). NFIP participation details are shown in Table 7.1.

Table 7.1 NFIP Status		
Community	Date of entry into program	Current effective map date
Hulett	4/1/99	9/28/2007
Moorcroft	3/1/86	2/2/2007
Sundance	8/19/89	2/2/2007

Sources of flooding in Crook County include the Belle Fourche River, the Little Missouri River, Arch Creek, Oak Creek, Inyan Kara Creek, Miller Creek and other small creeks, washes and drainages.

Figures 7.1 through 7.4 depict the flood hazards in Crook County. DFIRM –based flood hazard areas are shown where available. HAZUS-MH generated floodplains are shown elsewhere, based on data generated by FEMA Region VIII and provided by the State of Wyoming Office of Homeland Security.

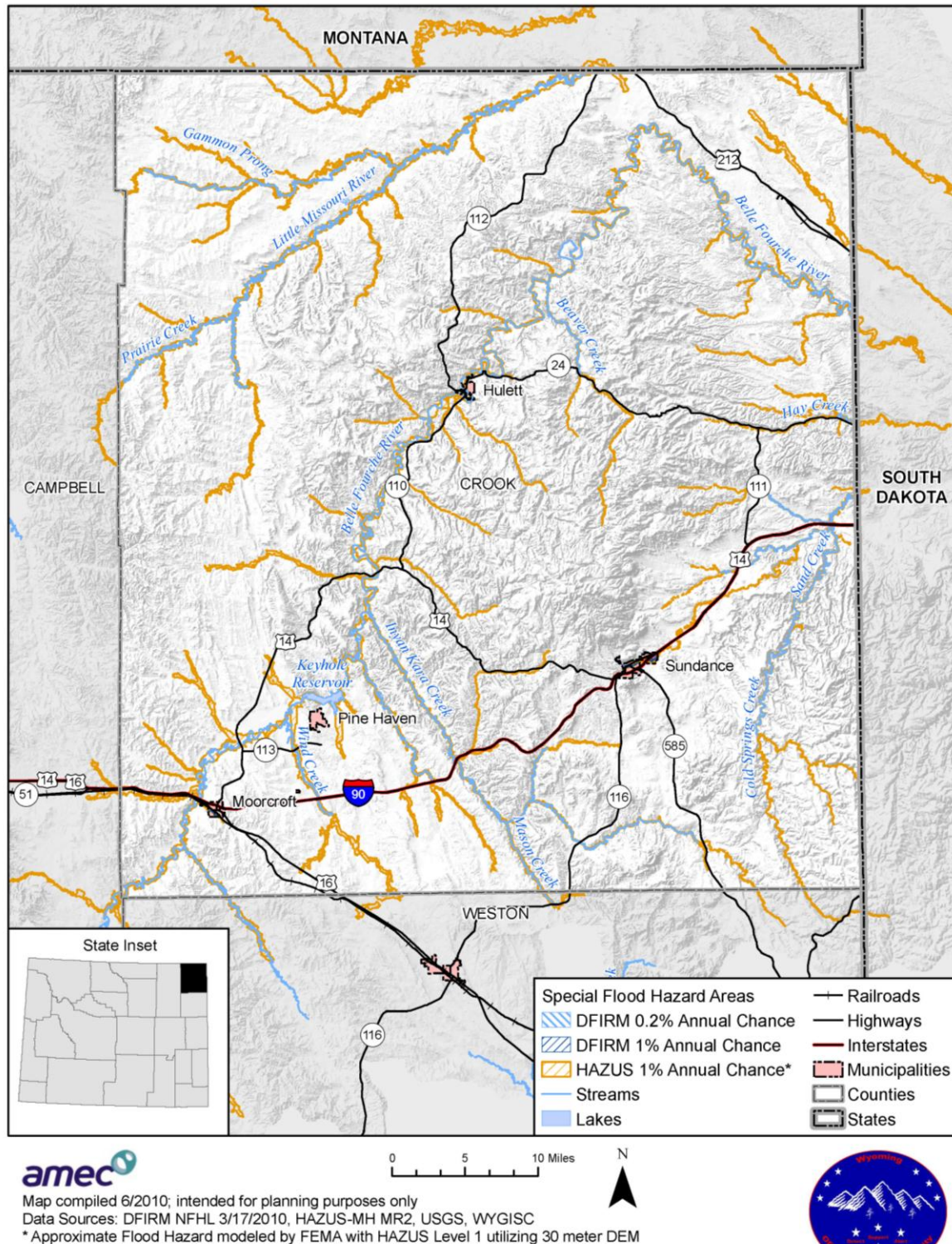


Figure 7.1 Crook County DFIRM and HAZUS Flood Hazards

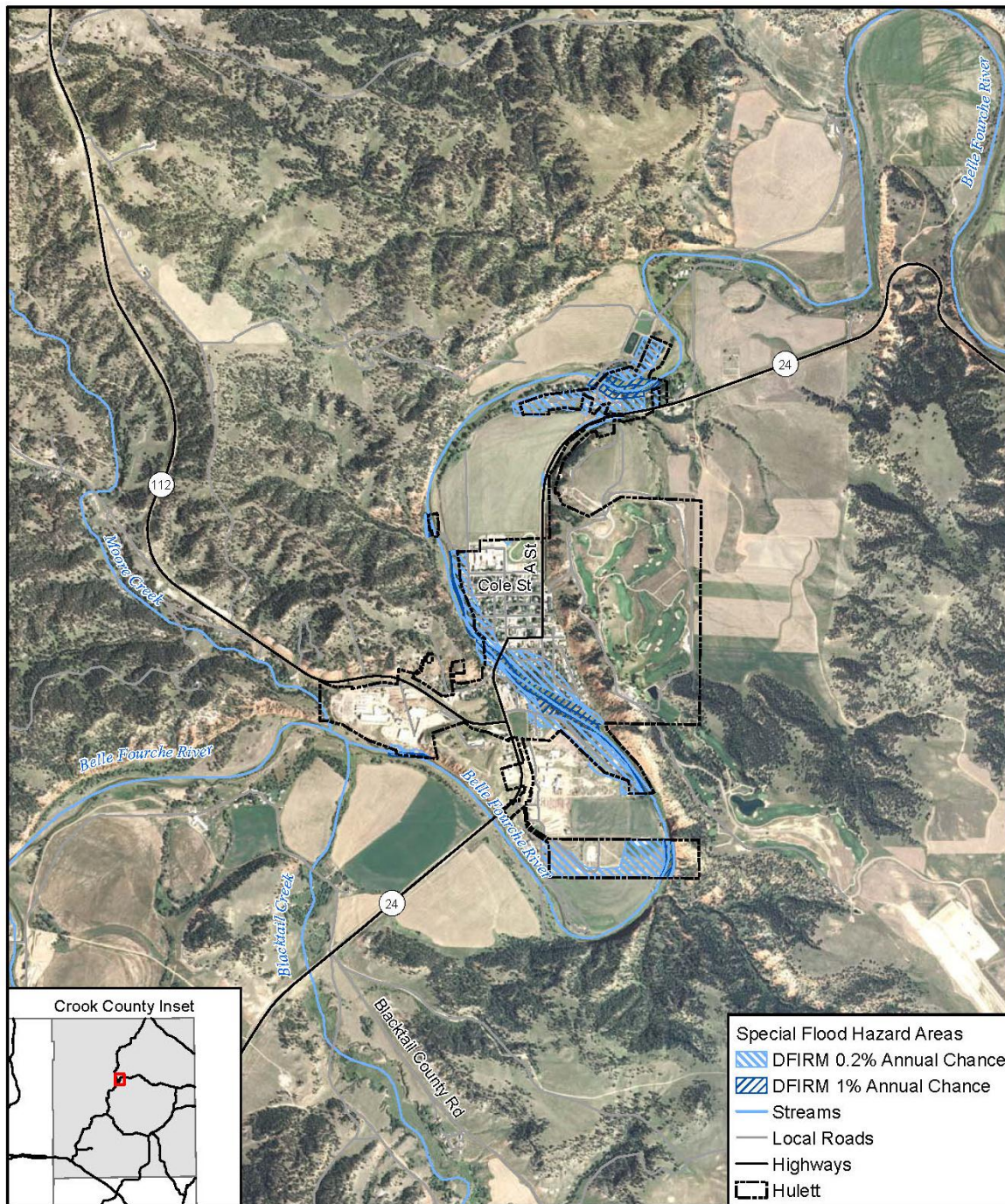


Figure 7.2 Town of Hulett DFIRM Flood Hazards

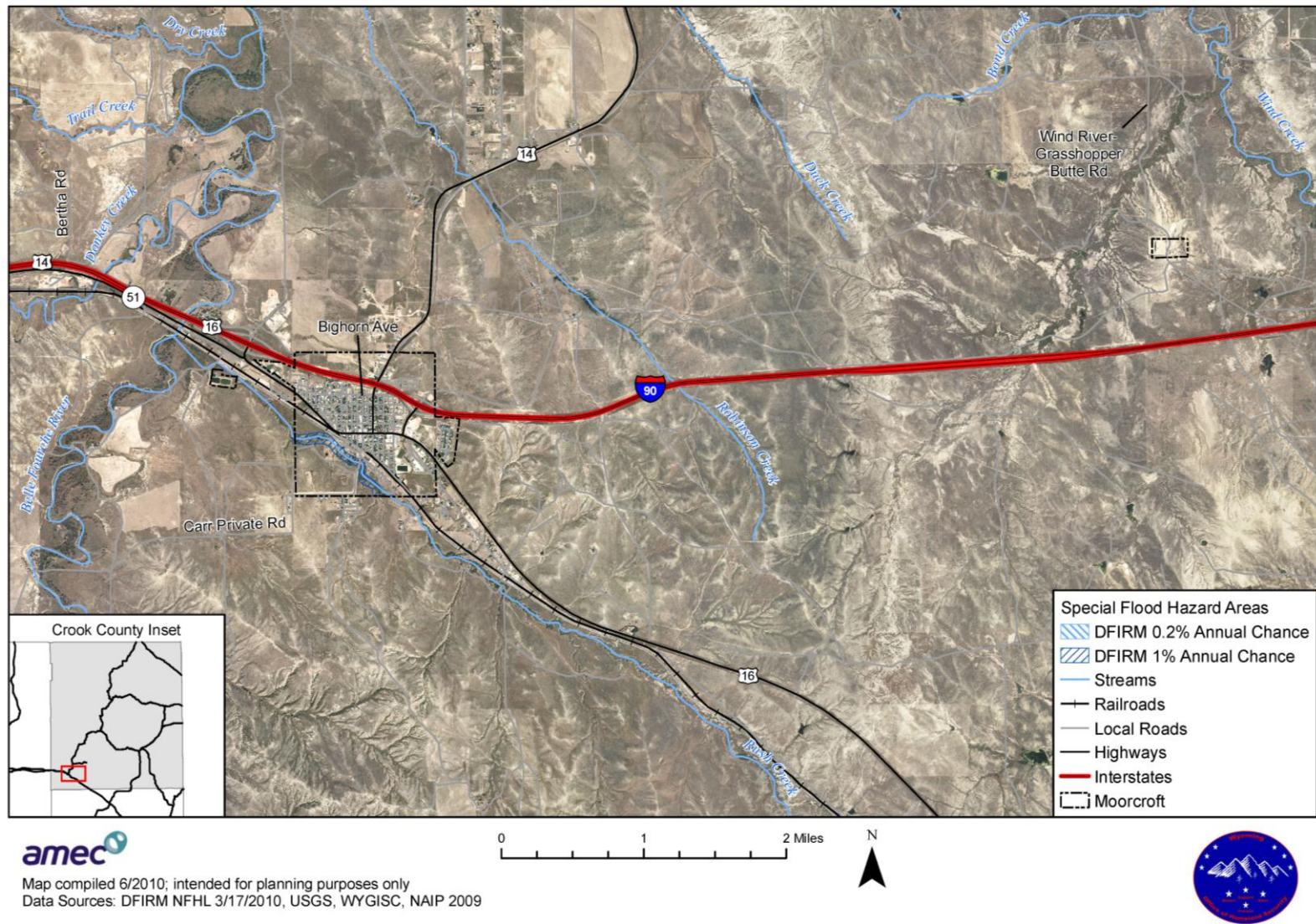


Figure 7.3 Town of Moorcroft DFIRM Flood Hazards

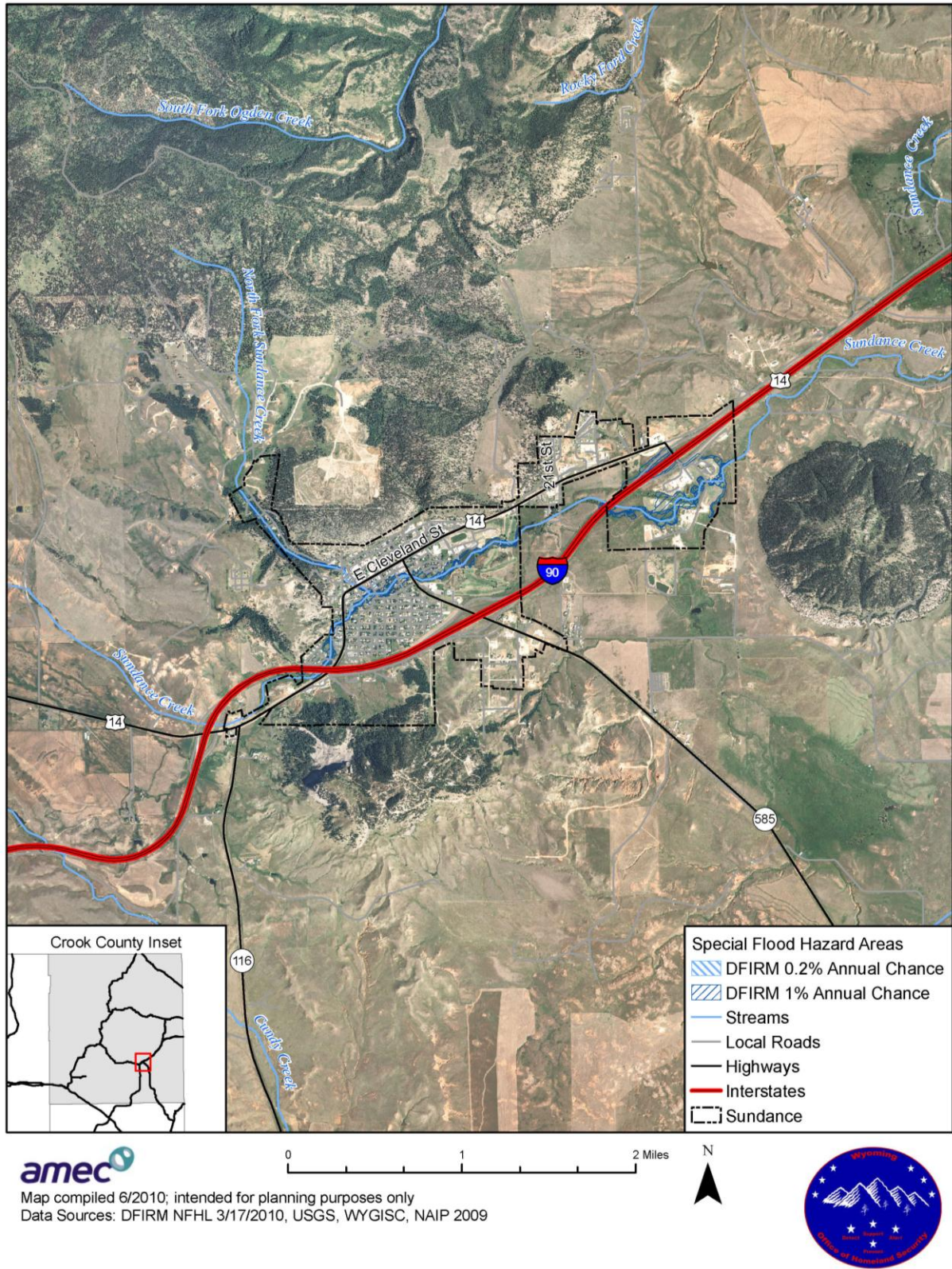


Figure 7.4 Town of Sundance DFIRM Flood Hazards

History

The documented flood history for Crook County extends back to January 1943. The most significant events are discussed in further detail below.

On June 24, 1959, a storm moved down Miller Creek with hail stones to 4 inches in diameter. Some flash flooding occurred resulting in \$24,700 in damage in 1959 dollars. This equates to \$195,475 in 2012 dollars.

On August 21, 1973, a torrential rain caused flash flooding on Sand Creek, washing out some roads and damaging houses. Apparently a pickup truck and a trailer were also washed into a bridge abutment. Damage was estimated at \$22,500 in 1973 dollars, which equates to approximately \$116,695 in 2012 dollars.

On August 11, 1987, a severe thunderstorm swept through north central Crook County. This storm produced heavy rain and hail from one-quarter of an inch to two inches in diameter near Hulett. Wyoming Highway 24 south of Hulett was closed for a short time due to one- to two-foot drifts of hail and flooding as more than two inches of rain fell in about 30 minutes. Ranchers south of Hulett reported numerous windows shattered and roof and siding damage due to hail. Ranchers north of Aladdin reported washed out fences and the loss of livestock. Grain crops were battered flat by the hailstorm from Alva to Aladdin. The hail one mile west of Alva drifted to a depth from 4 inches to over 12 inches.

The abbreviated flood history in Table 7.2 below was in large part derived from the monthly Storm Data reports generated and released by NCDC. Other sources are unpublished reports from the Wyoming Office of Homeland Security, newspaper accounts, and periodicals from public libraries. The table represents floods that have caused damage, injuries, or loss of life. A damaging flood occurs in the County every 3.3 years on average, based upon the historical data presented below.

Table 7.2 Crook County Flood Data: 1943-2012

County	Location	Start Date	Deaths	Injuries	Prprty Dmg	Crop Dmg	Total Dmg	Information
Crook	Northeast portion of the state	1-Jan-1943						Chinook conditions over the northeast portion of the State caused rapid melting of the snow, and as a result, serious floods occurred. The Town of Gillette was especially hard hit by a flood on the 22 nd . Reports from the Big Horn Basin state that the ice in the river went out on the 22 nd causing serious floods to farms near the river.
Crook		17-May-1944						A tornado was reported which resulted in considerable damage. This storm occurred during the afternoon and evening of the 17 th . It began in the Black Hills Region of South Dakota and moved northwestward across the northeast portion of Crook County. Principal damage in this storm was to ranch buildings, standing timber, and considerable stored grain. Heavy rain and hail accompanying the storm resulted in many bridges and large sections of the highway being washed out. No deaths resulted from the storm, although several persons were injured, none seriously, principally by flying glass.
Crook	Northeast Wyoming	2-Aug-1953						A heavy rain the afternoon of the 2 nd caused flood and property damage in the northeastern Wyoming estimated at \$50,000 and crop damage of \$1,000.
Crook	South of Sundance, Miller Creek	24-Jun-1959	0	0	\$2,250	\$22,500	\$24,750	Storm moved down Miller Creek with hail stones to 4 inches in diameter. Some flash flooding from heavy rain.
Crook	Beuhla 21, Sand Creek	21-Aug-1973	0	0	\$22,500	\$0	\$22,500	A torrential rain caused flash flooding on Sand Creek, washing out some roads and damaging houses. Apparently a pickup truck and a trailer were also washed into a bridge abutment.
Crook	Oshoto, Sundance, Moskee	13-Jun-1982	0	0	\$0	\$0	\$0	A thunderstorm dumped up to 7 inches of rain throughout the southeastern part of Crook County along with hail drifts from two to five feet in some places. The hail ranged from pea size up to one inch in diameter and caused considerable damage. Losses included fences, corrals, water tanks, soil and stock. The major damage in the Moskee and Oshoto areas was due to flooding.
Crook	Moorcroft	24-Jul-1982	0	0	\$2,250	\$2,250	\$4,500	A thunderstorm dumped 2.3 inches of rain in a short period of time causing local flooding. It was also spawned a tornado and marble-size hail which left a path of destruction in the Buck Miller subdivision north of town and damaged crops in the area.
Crook	1W Alva	11-Aug-1987	0	0	\$22,500	\$22,500	\$45,000	A severe thunderstorm swept through north central Crook County after 1715 MST. This storm produced heavy rain and hail from 0.25 inch to 2 inches in diameter near Hulett. Wyoming Highway 24 south of Hulett was closed for a short time due to one-to 2-foot drifts of hail and minor flooding as more than two inches of rain fell in about 30 minutes. Ranchers south of Hulett reported numerous windows shattered and roof and siding damage due to hail. Ranchers north of Aladdin reported washed out fences and the loss of livestock. Grain crops were battered flat by the hailstorm from Alva to Aladdin. The hail one mile west of Alva drifted to a depth from 4 inches to over 12 inches.
Crook	Sundance	13-Jun-1991	0	0	\$0	\$0	\$0	A thunderstorm over Sundance produced nearly 2.72 inches of rain in 45 minutes with street and basement flooding.

Table 7.2 Crook County Flood Data: 1943-2012

County	Location	Start Date	Deaths	Injuries	Prprty Dmg	Crop Dmg	Total Dmg	Information
Crook		8-May-1995	0	0	\$0	\$0	\$0	Moderate to heavy rain caused flash flooding in the Wyoming Black Hills in Crook county. Three to 7 inches of rain fell on the 8th of May. Aladdin (19 miles northeast of Sundance) had 7 inches of rain over the two day period. Seventeen roads in the Wyoming Black Hills were reported washed out. A part of Wyoming highway 24 under construction was washed out by flood waters. The Belle Fourche river rose above flood stage early on the 9th and caused a lot of rural flooding.
Crook	35 N Sundance, Little Missouri River	30-Jun-2001	0	0	\$0	\$0	\$0	Locally heavy rain from thunderstorms overnight produced a flash flood on the Little Missouri River at Government Canyon. A road was washed out and 8 feet of water was covering the roadway.
Crook and Weston	14 ENE Upton	23-Aug-2005	0	0	\$0	\$0	\$0	Severe thunderstorms developed across southern Crook County and western Weston County. The storms produced penny to quarter sized hail between Upton and Sundance. Heavy rains caused some flooding of secondary roads between Moorcroft and Upton. Wagner Road, from Pine Ridge Road to U.S. Highway 16 in south central Crook County, was closed during the evening and nighttime hours.
Crook	Moorcroft	5-May-2007	0	0	\$0	\$0	\$0	Heavy rains fell across northeastern Wyoming as a strong storm system crossed the region. Two to five inches of rain in 36 hours caused significant runoff and flooding in the Gillette area. The Little Powder River and Donkey Creek rose above bankfull. The Belle Fourche River near Moorcroft crested a half foot below flood stage, but remained within its banks. Some gravel roads were damaged across northern Campbell and western Crook counties.
Crook	Moorcroft	23-May-2008	0	0	\$0	\$0	\$0	As much as four inches of rain in two days caused widespread flooding over northeastern Wyoming. The flooding washed out culverts and forced the closing of secondary roads. A few homes and basements were also flooded.
Crook	Colony	5-Jun-2008	0	0	\$100,000	\$0	\$100,000	Rainfall of one and a half to three inches caused minor flooding in northeastern Crook County. The Belle Fourche River, Oak Creek, Hay Creek, and other small streams flooded roads north of Aladdin.
Crook	5 S Colony	18-May-2010	0	0	\$0	\$0	\$0	Around four inches of rain caused flash flooding along small creeks in northeastern Crook County between Aladdin and Colony. At least four inches of rain fell in less than three hours, causing flash flooding along Oak Creek.
Crook	Lightning Flat	21-May-2011	0	0	\$0	\$0	\$0	Runoff from heavy rain over several days caused flooding in the Black Hills and Bear Lodge Mountains. Water inundated areas along the Little Missouri River and Belle Fourche River in northeastern Crook County. Several rural roads in eastern Crook County were washed out or impassible.
Crook	7 W Oshoto	2-Jul-2011	0	0	\$0	\$0	\$0	Runoff from two to three inches of rain caused flash flooding in portions of Crook County. Minor flooding occurred along Cabin Creek and other small streams around Keyhole Reservoir.
Crook	Colony	11-Mar-2012	0	0	\$0	\$0	\$0	Unseasonably warm temperatures caused snow over the Bear Lodge Mountains to melt rapidly, which combined with ice break-up to cause minor flooding along the Belle Fourche River and its tributaries below the Keyhole Reservoir.

Regional Flood Events Involving Crook County								
Counties	Location	Start Date	Deaths	Injuries	Prprty Dmg	Crop Dmg	Total Dmg	Information
Park, Big Horn, Campbell, Converse, Crook, Johnson, Natrona, Sheridan, Washakie, Weston, Hot Springs, and Niobrara	Central and North portions of Wyoming	15-May-1978	0	0	\$15,500,000	\$0	\$15,500,000	Heavy wet snow and record rains did very extensive damage to property, crops, and livestock in 12 counties. Hundreds of homes were damaged, and many totally destroyed. Numerous bridges and sections of roads were washed out, power lines downed, with much damage to cars and personal property. Total estimated damages came to \$15.5 million. The following are discharge amounts from WEMA Storm Data: Fifteenmile Creek near Worland (May 18) - 4,270 CFS, Big Horn River at Worland (May 19) - 17,500 CFS, Nowood River near Ten Sleep (May 19) - 3,380 CFS, Shoshone River near Lovell (May 18) - 7,680 CFS, Elk Creek near Basin (May 19) - 2,450 CFS, Shell Creek near Greybull (May 19) - 2,150 CFS, Big Horn River near Kane (May 20) - 20,700 CFS, Little Powder River below Corral Creek near Weston (May 18) - 2,410 CFS, Little Powder River above Dry Creek near Weston (May 19) - 4,460 CFS, Little Powder River above Dry Creek near Weston (May 19) - 5,300 CFS, Salt Creek near Sussex (May 18) - 10,200 CFS, Dead Horse Creek near Buffalo (May 18) - 1,420 CFS, Clear Creek below Rock Creek 162? CFS, Powder River near Kaycee (May 18) - 4,200 CFS, Powder River at Sussex (May 19) - 24,000 CFS, South Fork River near Kaycee (May 20) - 8,200 CFS, Bitter Creek near Garland (May 17) - 552 CFS, Whistle Creek near Garland (May 18) - 2,340 CFS, Shoshone River below Buffalo Bill Reservoir (May 19) - 1,230 CFS, Shoshone River near Garland (May 19) - 4,550 CFS, Goose Creek below Sheridan (May 18) - 5,430 CFS, Prairie Dog Creek near Acme (May 19) - 3,940 CFS, Clear Creek at Ucross 1740 (May 19) - 32,500 CFS, Crazy Woman Creek at Upper Station (May 20) - 2,200 CFS, Little Thunder Creek near Hampshire (May 18) - 3,030 CFS, Black Thunder Creek near Hampshire (May 18) - 5,050 CFS, Turner Creek near Osage (May 18) - 2,480 CFS, Beaver Creek near Newcastle (May 19) - 3,870 CFS. The event was estimated to be a 20- to greater than 100-year flood
Campbell and Crook	Gillette 8s	30-Jul-1987	0	0	\$225,000	\$0	\$225,000	A very strong thunderstorm developed near Savageton, about 40 miles southwest of Gillette, at 2045 MST. This storm drenched the town with 1.5 inches of rain in 35 minutes along with 1.5 inch diameter hail. The storm later moved northeast during the next few hours and damaged structures in the south and east sections of Gillette. As the thunderstorm moved into Gillette, 50 to 60 mile an hour winds raked the area along with 1.5 inches of rain in 1 hour. This storm destroyed one unoccupied home. Other damages included numerous horse stalls destroyed, sections of roofs partially destroyed and many city and state road signs severely damaged. Also, lightning struck a home in Gillette and knocked a hole in the ceiling. Many streets and a few apartments were flooded due to the torrential rains between 2100 and 2200 MST. Later that night the very strong thunderstorm moved into Crook County with heavy rain and 0.5 inch diameter hail west of Moorcroft.

Impacts

The flood history above shows that damaging floods have occurred occasionally in Crook County. On average, a damaging flood occurs about every 3.3 years. Fortunately, there has been no loss of life or any significant injury caused by floods in the County.

Flood of Record for Future Impacts

The May 15, 1978 flood is the most damaging event recorded and considered to be the flood of record for Crook County. Since this flood affected 12 counties, one-twelfth of the total dollar losses can be used as an estimation of loss per county. This value is roughly \$1.3 million in year of damage dollars. As a result of adjusting the dollar losses to a 2012 equivalent, the damage sum is \$4.65 million, which can be used as an estimate of the expected damages for future major flood events in Crook County. There is potential for larger floods to occur in the region.

Flood Analysis

Planning level flood loss estimates were made available for every county in Wyoming with the 2010 update to the Wyoming Hazard Mitigation Plan. FEMA used HAZUS-MH MR2 to model the 100-year floodplain and perform associated building and population risk assessments. HAZUS-MH is FEMA's GIS-based natural hazard loss estimation software. The HAZUS-MH flood model results include analysis for Crook County, modeling streams draining a 10 square mile minimum drainage area, using 30 meter (1 arc second) Digital Elevation Models (DEM). Hydrology and hydraulic processes utilize the DEMs, along with flows from USGS regional regression equations and stream gauge data, to determine reach discharges and to model the floodplain. Losses are then calculated using HAZUS-MH national baseline inventories (buildings and population) at the census block level.

HAZUS-MH produces a flood polygon and flood-depth grid that represents the 100-year floodplain. The 100-year floodplain represents a flood that has a 1% chance of being equaled or exceeded in any single year. While not as accurate as official flood maps, these floodplain boundaries are available for use in GIS and could be valuable to communities that have not been mapped by the National Flood Insurance Program. HAZUS-MH generated damage estimates are directly related to depth of flooding and are based on FEMA's depth-damage functions. For example, a two-foot flood generally results in about 20% damage to the structure (which translates to 20% of the structure's replacement value). The HAZUS-MH flood analysis results provide number of buildings impacted, estimates of the building repair costs, and the associated loss of building contents and business inventory. Building damage can cause additional losses to a community as a whole by restricting the building's ability to function properly. Income loss data accounts for losses such as business interruption and rental income losses as well as the resources associated with damage repair and job and housing losses.

Potential losses derived from HAZUS-MH used default national databases and may contain inaccuracies; loss estimates should be used for planning level applications only. The damaged building counts generated are susceptible to rounding errors and are likely the weakest output of the model due to the use of census blocks for analysis. There could also be errors and

inadequacies associated with the hydrologic and hydraulic modeling of the HAZUS-MH model. In rural Wyoming, census blocks are large and often sparsely populated or developed; this may create inaccurate loss estimates. HAZUS-MH assumes population and building inventory to be evenly distributed over a census block; flooding may occur in a small section of the census block where there are not actually any buildings or people, but the model assumes that there is damage to that block. In addition, excessive flood depths may occur due to problems with a DEM or with modeling lake flooding. Errors in the extent and depth of the floodplain may also be present from the use of 30 meter digital elevation models. HAZUS Level II analyses based on local building inventory, higher resolution terrain models, and DFIRMs could be used in the future to refine and improve the accuracy of the results.

Maps and Results

A series of maps and analysis results were compiled for Crook County. Tables 7.3 and 7.4 contain the results of the HAZUS loss estimation. Building and contents value loss estimates, income-related loss estimates, and displaced population and shelter needs estimates are included in Table 7.3 Flood Loss by Municipality. These loss estimates have been grouped by municipality to demonstrate how the risk varies across the county. Per Capita Loss was calculated using total building loss and Census 2009 estimates to the municipal and county – level population. Percent Building Loss and Percent Contents Loss were calculated using building and contents loss estimates, and HAZUS building and contents exposure data. Table 7.4 HAZUS Loss Estimation Additional Analysis shows these estimates, also grouped by municipality.

The following 3 maps are provided at the county scale and for each municipality: the *Flood Hazards* map shows the HAZUS floodplain boundary, the *Flood Depth* map shows HAZUS flood depth data, and the *Building Loss* map shows total building loss, in dollars, by census block. It is important to note that the highest flood depth in the municipality maps indicates the maximum depth for the county and is not representative of the highest depth in that municipality.

According to the HAZUS model output, Crook County would suffer a total of \$14,355,000 in total direct economic loss to buildings and 425 people would be displaced in the event of a countywide 100-year flood. There would be a total of 67 damaged buildings, 32 of which would be substantially damaged (>50% damaged). The Belle Fourche River flows north through Hulett and across the entire county. The Town of Hulett would suffer the most damage of jurisdictions in the county, with a total direct economic loss for buildings of \$7,855,000 and 217 displaced people. The Town of Hulett also has the greatest Percent Building Loss (17.7%), Percent Contents Loss (29.5%), and Per Capita Loss (\$15,223) of the jurisdictions in the county. The unincorporated county would suffer \$137,493,000 of total direct economic loss for buildings. The total county, incorporated and unincorporated, would suffer 1.8% Building Loss, 2.7% Contents Loss, and \$2,158 Per Capita Loss.

Crook County has been mapped by the National Flood Insurance Program and has available Digital Flood Insurance Rate Maps (DFIRMs). It should be noted that DFIRMs are only available for Hulett, Moorcroft, and Sundance. DFIRM is considered to be best available

data, and is therefore represented here for comparison purposes. The DFIRM 1% Annual Chance and 0.2% Annual Chance are represented on the Flood Hazards map at both the county scale and for each of the municipalities. The available DFIRM in Crook County's jurisdictions for the 1% annual chance boundary is similar to the HAZUS 1% annual chance boundary. The HAZUS 1% annual chance boundary, however, is more extensive than the DFIRM in the Town of Hulett and likely overestimates the flood risk there.

A refined flood vulnerability assessment was performed for Crook County's municipalities using Geographic Information Systems (GIS) in 2012. The county's parcel layer and associated assessor's building improvement assessed values and property types were provided by the county and were used as the basis for the inventory. The available 2007 DFIRM for each jurisdiction was used as the hazard layers. The county does not have mapped DFIRM for the unincorporated areas, thus this analysis was limited to the municipalities. This parcel level analysis provided a more refined analysis for each jurisdiction than the HAZUS census block method, and also provides a more accurate building count. It also uses the DFIRM which is a more accurate representation of flood hazard than the HAZUS modeled floodplain. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel centroids. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. This method assumes that every parcel with an improved value greater than zero has a building on it.

Table 7.5 shows the results of the refined loss estimate for the municipalities. Content replacement values are estimated as a percent of the structure replacement values, based on HAZUS methodology. Based on this, residential properties contents are 50% and commercial properties contents are 100% of the improved value; the total value is the sum of the improved and estimated contents values. This table includes building exposure by 1% and 0.2% annual chance flood zones. The table includes a loss estimate which assumes a two-foot deep flood, which translates to 20% of the structure's replacement value based on FEMA depth damage relationships.

Of the three jurisdictions with DFIRM, Sundance has the greatest risk of flooding with an improved structure value of \$2,231,531 in the 1% annual flood zone and a total potential loss of \$830,503, assuming a two foot deep flood, which is greater than the HAZUS analysis estimated structure loss of \$426,000. Hulett has the next highest potential loss of \$67,424 in the 1% annual flood zone with an improved value of \$216,021 and a potential loss of \$698,353 in the 0.2% annual flood zone with \$2,311,172 of improvements and thus is more at risk to larger, less frequent flood events. Moorcroft had minimal buildings at risk to the 1% annual flood zone. The town of Pine Haven has no DFIRM.

Table 7.3 HAZUS Loss Estimation										
Municipality	Building Loss (\$K)	Contents Loss (\$K)	Inventory Loss (\$K)	Relocation Loss (\$K)	Capital Related Loss (\$K)	Wages Loss (\$K)	Rental Income Loss (\$K)	Total Loss (\$K)	# of Displaced People	# of People Needing Short Term Shelter
Hulett	3,709	3,987	68	12	24	52	3	7,855	217	161
Moorcroft	71	41	-	-	-	-	-	112	3	-
Pine Haven	-	-	-	-	-	-	-	-	-	-
Sundance	426	383	9	-	-	3	1	822	63	6
Unincorporated	2,989	2,451	84	2	1	39	-	5,566	142	3
TOTAL	7,195	6,862	161	14	25	94	4	14,355	425	170

Table 7.4 HAZUS Loss Estimation Additional Analysis										
Municipality	2009 Population*	Total Exposure (\$K)	Building Loss (\$K)	Building Exposure (\$K)	% Building Loss	Contents Loss (\$K)	Contents Exposure (\$K)	% Contents Loss	Total Loss (\$K)	Per Capita Loss (\$)
Hulett	516	34,462	3,709	20,950	17.7%	3,987	13,512	29.5%	7,855	15,223
Moorcroft	926	86,488	71	51,300	0.1%	41	35,188	0.1%	112	121
Pine Haven	396	41,263	-	24,082	0.0%	-	17,181	0.0%	-	0
Sundance	1,339	138,390	426	85,192	0.5%	383	53,198	0.7%	822	614
Unincorporated	3,476	346,687	2,989	209,194	1.4%	2,451	137,493	1.8%	5,566	1,601
TOTAL	6,653	647,290	7,195	390,718	1.8%	6,862	256,572	2.7%	14,355	2,158

Table 7.5 Refined Flood Loss Estimation by Municipality						
DFIRM Zones	Property Type	Property Count	Improved Value	Content Value	Total Value	Potential Loss at 20%
Hulett						
Zone AE	Commercial	1	\$26,176	\$26,176	\$52,352	\$10,470
	Residential	3	\$189,845	\$94,923	\$284,768	\$56,954
Total 1% Annual Chance		4	\$216,021	\$121,099	\$337,120	\$67,424
0.2% Annual Chance	Commercial	1	\$50,014	\$50,014	\$100,028	\$20,006
	Residential	43	\$2,261,158	\$1,130,579	\$3,391,737	\$678,347
Total 0.2% Annual Chance		44	\$2,311,172	\$1,180,593	\$3,491,765	\$698,353
Total Flood		48	\$2,527,193	\$1,301,692	\$3,828,885	\$765,777
Moorcroft						
Zone A	Residential	1	\$330	\$165	\$495	\$99
Total 1% Annual Chance		1	\$330	\$165	\$495	\$99
Sundance						
Zone A	Residential	2	\$105,584	\$52,792	\$158,376	\$31,675
Zone AE	Commercial	3	\$1,610,439	\$1,610,439	\$3,220,878	\$644,176
	Residential	18	\$515,508	\$257,754	\$773,262	\$154,652
Total 1% Annual Chance		23	\$2,231,531	\$1,920,985	\$4,152,516	\$830,503
Total Flooding Summary for Municipalities						
Grand Total 1% Flooding		28	\$2,447,882	\$2,042,249	\$4,490,131	\$898,026
Grand Total 0.2% Flooding		44	\$2,311,172	\$1,180,593	\$3,491,765	\$698,353
Grand Total Flooding		72	\$4,759,054	\$3,222,842	\$7,981,896	\$1,596,379

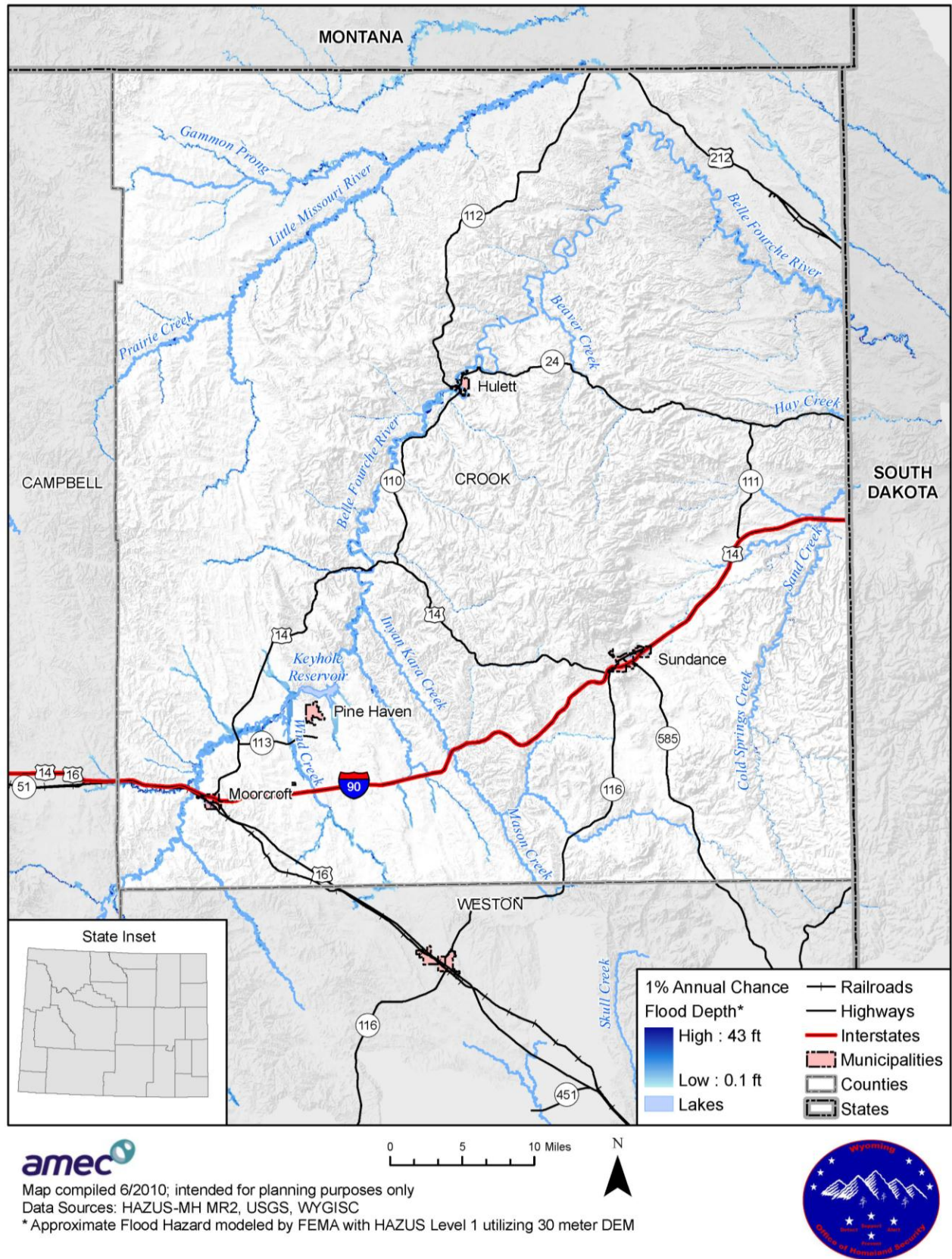


Figure 7.5 Crook County HAZUS Flood Depth

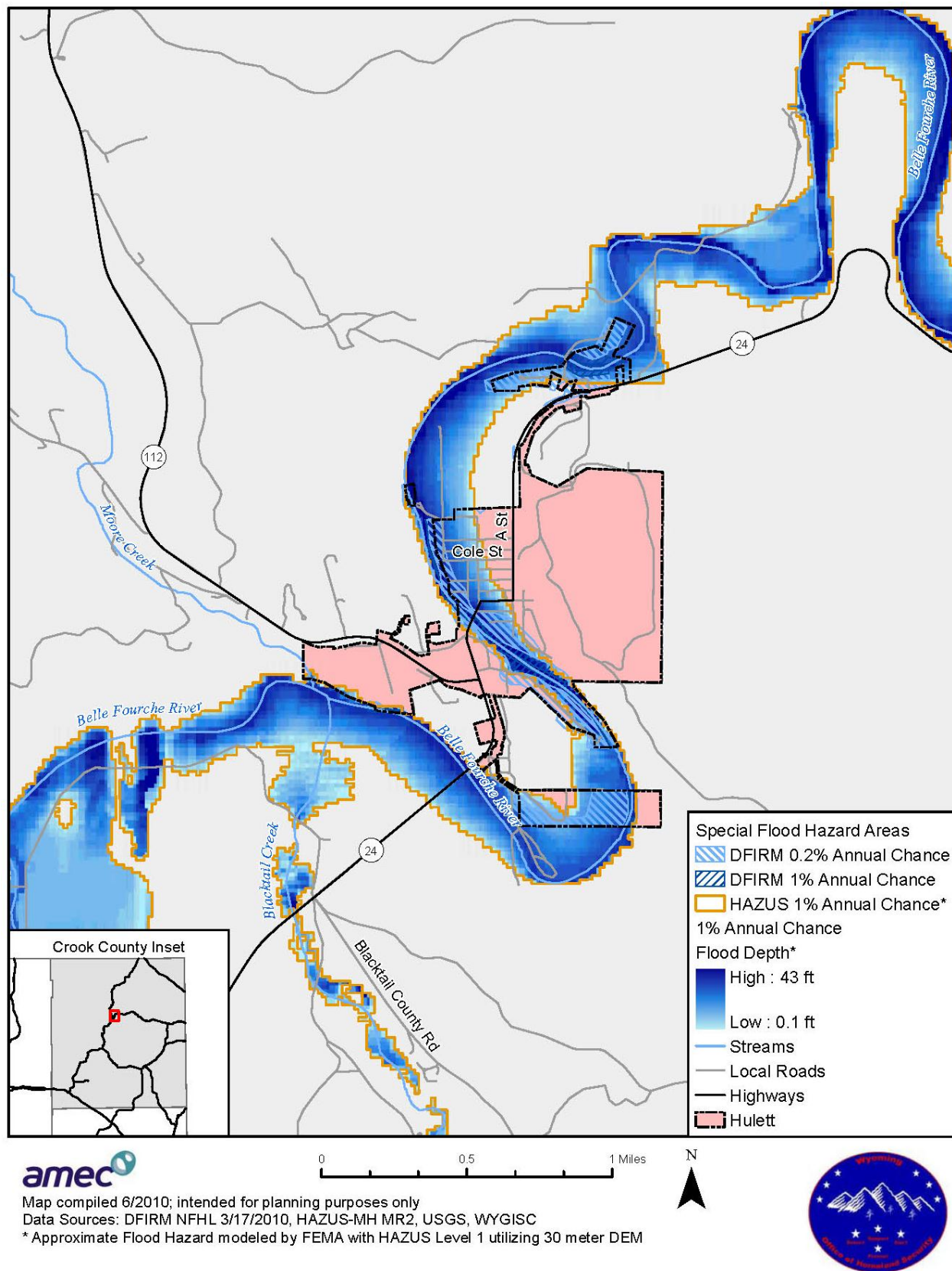
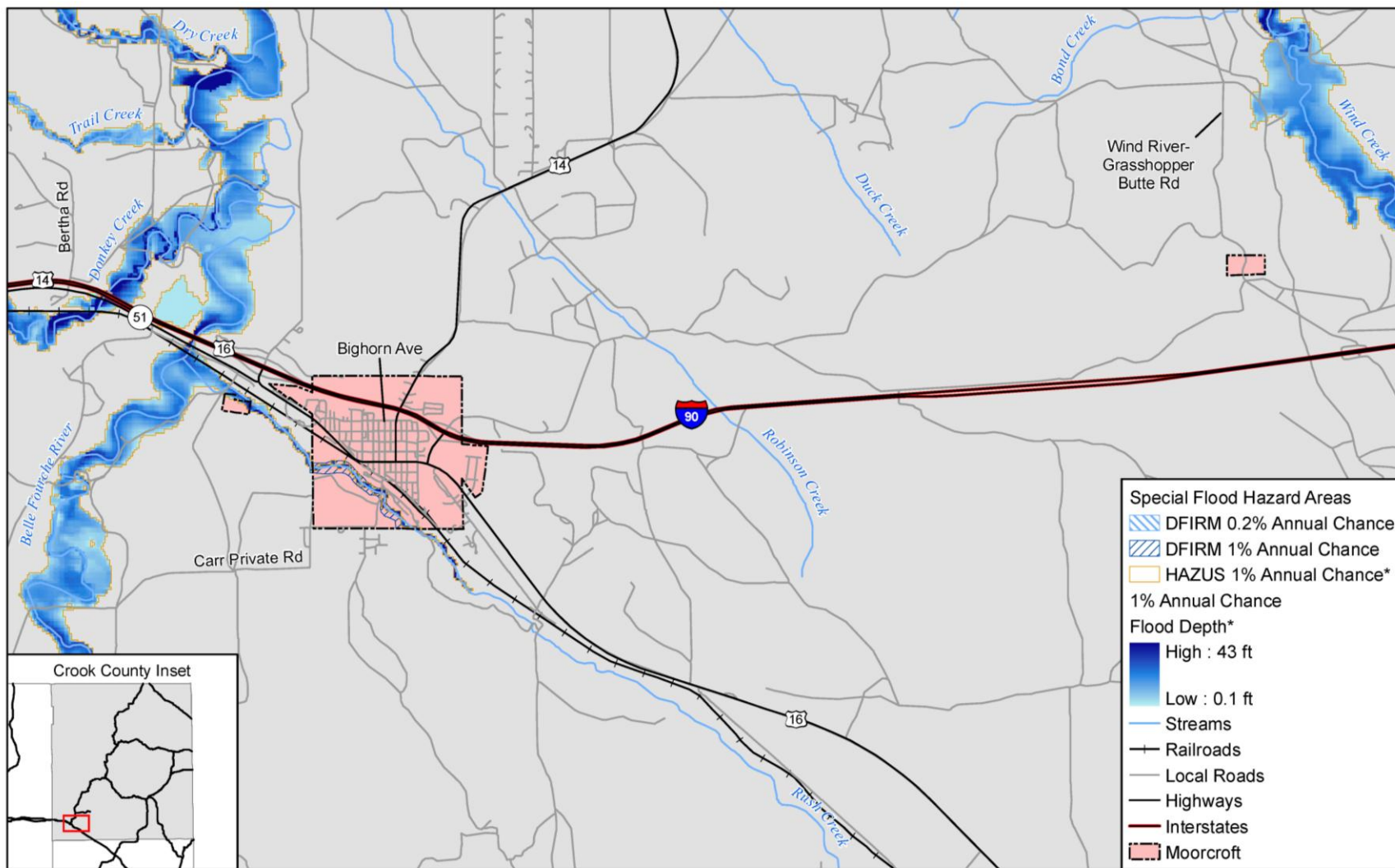


Figure 7.6 Town of Hulett DFIRM and HAZUS Flood Depth



Map compiled 6/2010; intended for planning purposes only

Data Sources: DFIRM NFHL 3/17/2010, HAZUS-MH MR2, USGS, WYGISC

* Approximate Flood Hazard modeled by FEMA with HAZUS Level 1 utilizing 30 meter DEM

Figure 7.7 Town of Moorcroft DFIRM and HAZUS Flood Depth

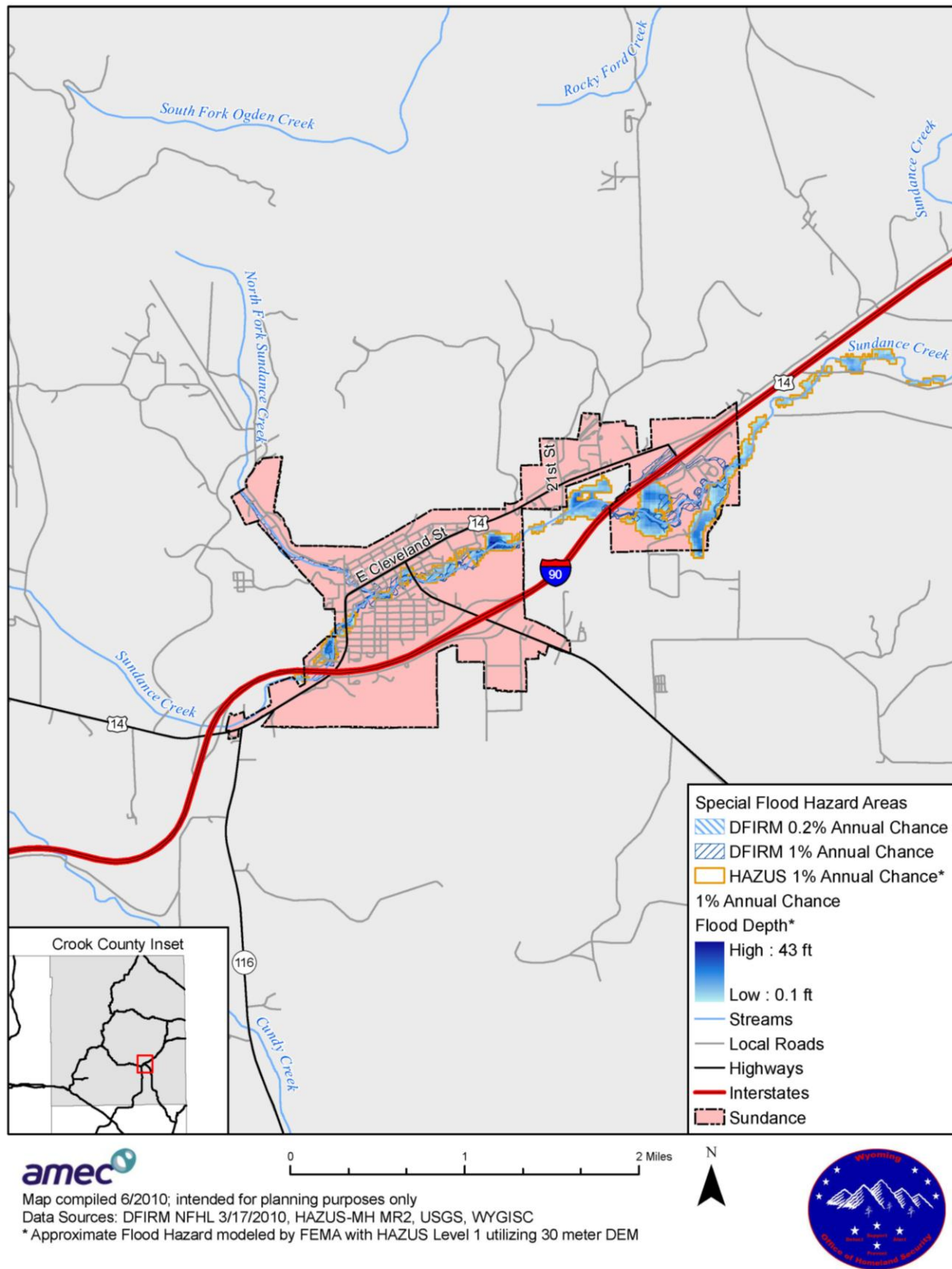
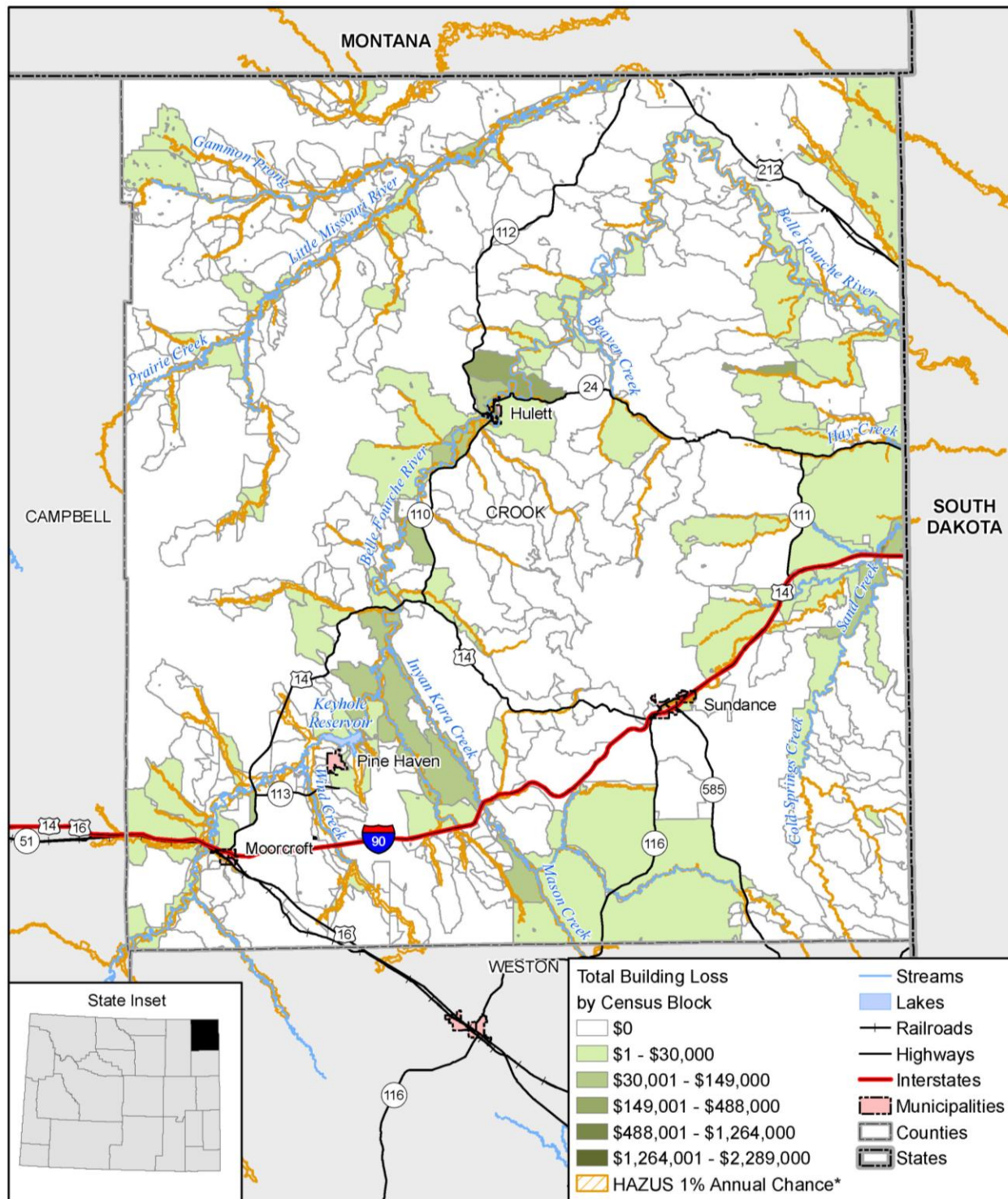


Figure 7.8 Town of Sundance DFIRM and HAZUS Flood Depth



Map compiled 6/2010; intended for planning purposes only

Data Sources: HAZUS-MH MR2, USGS, WYGIS

* Approximate Flood Hazard modeled by FEMA with HAZUS Level 1 utilizing 30 meter DEM



Figure 7.9 Crook County HAZUS Building Loss

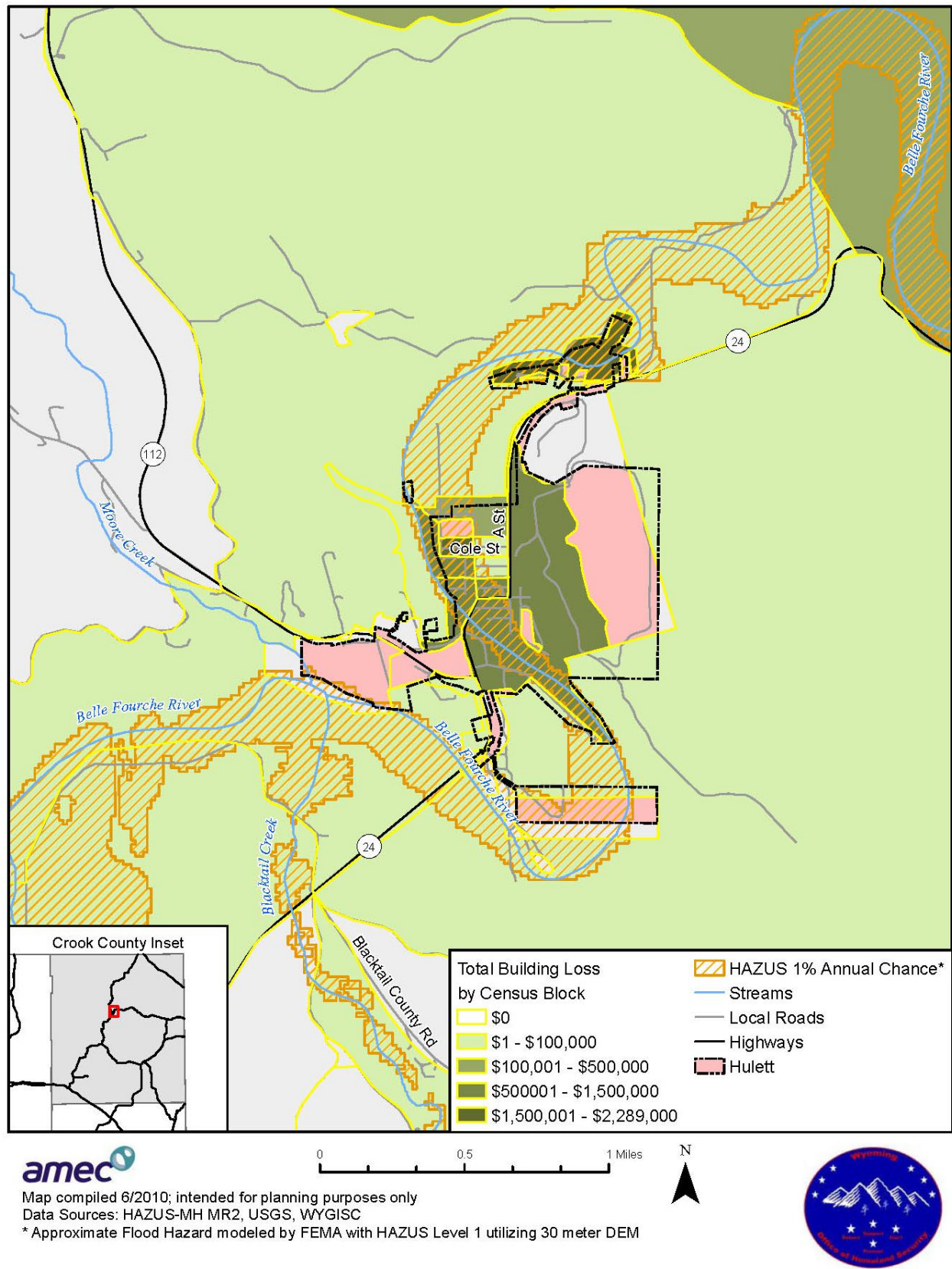
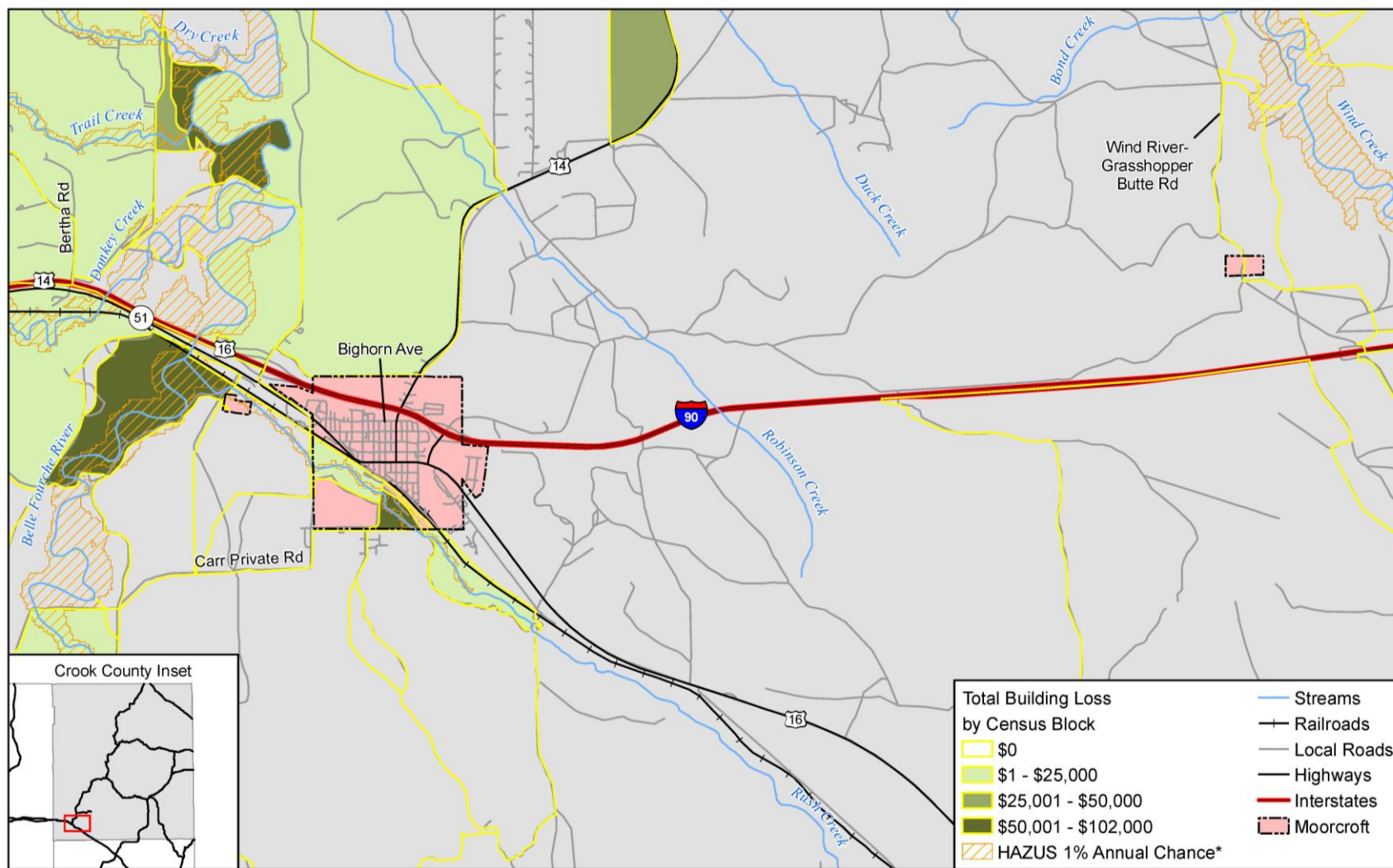


Figure 7.9 Town of Hulett HAZUS Building Loss



Map compiled 6/2010; intended for planning purposes only
Data Sources: HAZUS-MH MR2, USGS, WYGIS

* Approximate Flood Hazard modeled by FEMA with HAZUS Level 1 utilizing 30 meter DEM

Figure 7.10 Town of Moorcroft HAZUS Building Loss

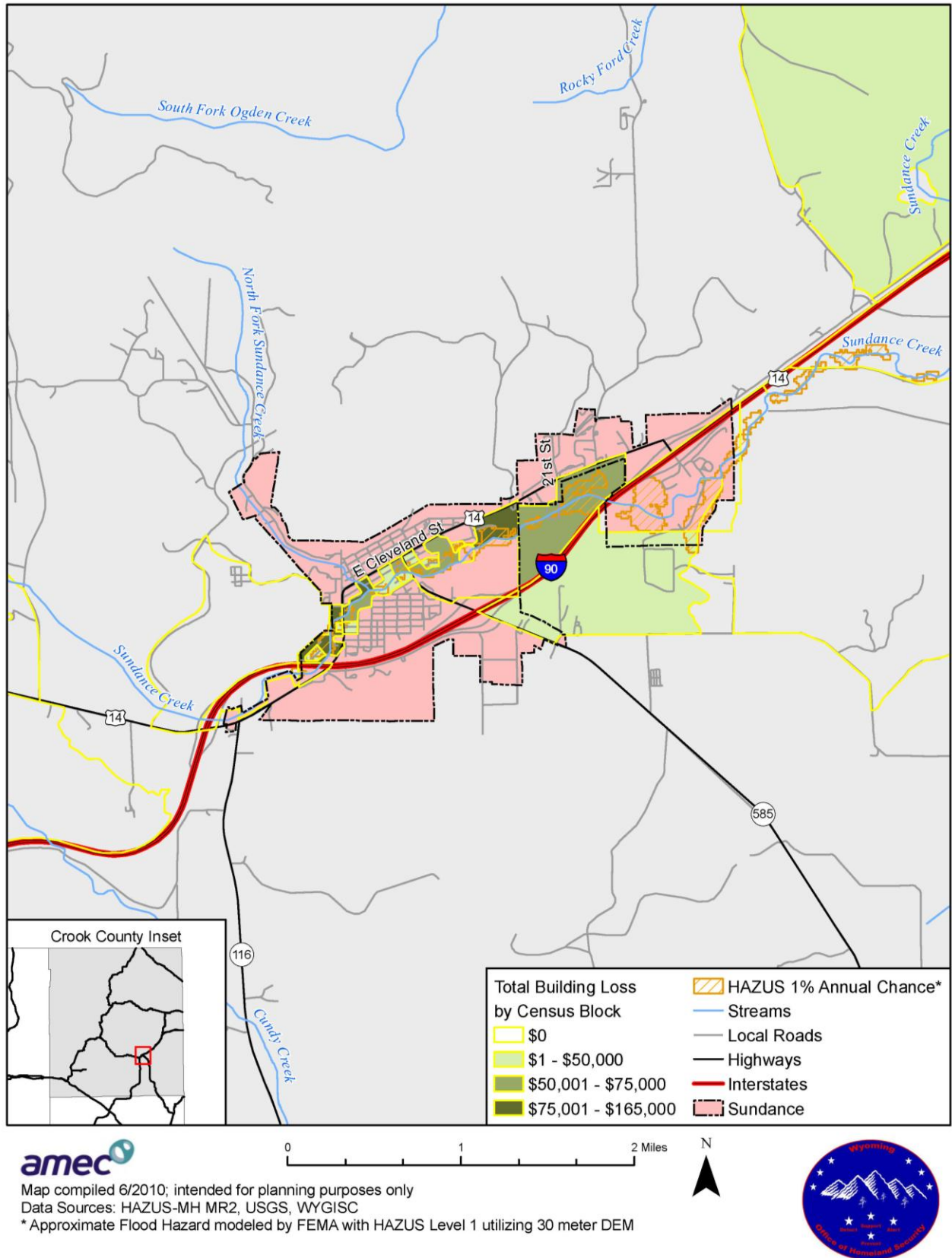


Figure 7.10 Town of Sundance HAZUS Building Loss

Summary

PROPERTY AFFECTED: Medium

POPULATION AFFECTED: Medium

PROBABILITY: Medium

JURISDICTION AFFECTED: Hulett, Sundance, portions of the unincorporated county